acts of "Fowler's Steam Tackle" are in use, the soil being turned over to a depth of from fourteen to sixteen inches. For ordinary plowing for long rattoons, mule power is used—breaking the soil up, putting fertilizer in and filling up. In fertilizing, from 600 to 1000 pounds of Hackfelds' high-grade fertilizer is used to the acre, varying of course according to the soil. The cane matures in from sixteen to eighteen months, while cane planted from June to October tassels the following October.

The average annual rainfall in this section of Kauai is thirty-six inches. The main water supply for irrigation purposes is from mountain streams, being led off from the main source by a system of ditches to large storage reservoirs constructed at stated intervals upon the plantation lands, from whence the supply is distributed to the cane fields. At the present time these reservoirs have a joint capacity for storing 150,000,000 gallons of water, but with the additional reservoir system now in course of construction the amount will be increased to 200,000,000 gallons.

The method of transporting the cane to mill is a system of main and portable railways. The aggregate length of the main line is thirty-five miles, and there are six miles of field or portable tracks. The rolling stock consists of 400 cane cars, twelve double truck flat cars for freight, forty other cars and four locomotives of the Baldwin and German types.

At Kealia on the company's land a splendid artesian flow of water was struck, containing only four grains of salt to an imperial gallon, which is used for mill purposes.

The plantation has been in operation since 1877. Some of the fields have been planted consecutively for twenty-four years, yet today yield more sugar to the acre of cane than in former years. The average number of tons of sugar produced to the acre is as follows: Plant cane, 5.06; long rattoons, 4.50; short rattoons, 2.50.

The company employs about 1000 laborers, the majority of whom are unskilled hands or field laborers paid an average of $20 per month of twenty-six days. For the 1902 crop some 370 men are engaged under the co-operative system, taking care of 2000 acres. Some of the 1903 crop will be cared for and brought to maturity under the co-operative plan. The laborer, in addition to his pay of $20 per month, receives free water, fuel, house and medical attendance.

The output of sugar for the season of 1901 was 9954 tons, while the output for the season of 1902 will be slightly in excess of this.

As showing the extent of the plantation under discussion, it may be stated that it extends from near the Wailua river to the Moloaa lands, a distance of eight miles along the sea coast.

It was here that the first diffusion mill was erected in the Hawaiian Islands, which has recently been superseded by a new maceration process mill. By December of the present year the company will have in complete operation one of the most complete mills on the Island of Kauai. It is a modern nine-roller plant, each mill of three rollers being 34 x 72 inches, made by the Honolulu Iron Works Company, and having a capacity for grinding 1000 tons of cane a day, producing 125 tons of raw sugar. The various mechanical appliances required in a sugar factory have been installed by the Kilby Manufacturing Company of Cleveland, Ohio, consisting in the main of a complete super-heating clarification system with continuous settling tanks, an extensive sand filtration system, through which the light and heavy juices are filtered (the sand carrying a large percentage of lime), evaporators of the Wellner-Jelinek type, ten 40-inch belt-driven centrifugals of the Weston type, eight crystallizers with capacity of thirty tons of Masse-cuite and two Kilby pans with capacity to strike thirty-five tons of sugar.

Everything about the mill has been arranged so as to enable the engineer and sugar boiler to have a complete view of the machinery at all times. Directly operated overhead in the mill is a large traveling crane capable of moving a weight of twenty-five tons. The bagasse or residue from the cane is conveyed by carriers to fuel room, and fed automatically to the furnaces by the aid of "Yankee Feeders." Some coal is used, and the management has under contemplation the use of crude oil for fuel. The mill extraction of sucrose in cane, according to condition of cane, is from 91 to 92 per cent. The mill is supplied with several filter presses, the mud from which is used for fertilizer.

Adjoining the mill has been erected a large warehouse having a capacity for holding 100,000 bags of sugar in case of an emergency. Both mill and warehouse are constructed of skeleton steel with corrugated iron roof and walls. Independent of the main mill power there has been installed supplemental power for operating the ice-making plant, which has a capacity for turning out three tons of ice a day. By this auxiliary power, when the mill is shut down, the machine shops can be kept in operation.

A 500-light electric plant has been installed with a Bullock dynamo, operated by a Ball engine.

The company practically makes four grades of sugar, the No. 1 being shipping sugar, but the lower grades are worked over into the No. 1 grade. It is the intention of the company, however, to manufacture two grades, to be known as Nos. 1 and 2.

About 250 acres of rice land is rented by the Makee Sugar Company to Chinese. Upon the plantation are seventy head of work horses and about 1500 head of cattle, the latter being raised for beef that is entirely consumed upon the plantation. The company slaughters from twelve to fifteen head a month. Some 500 calves are branded annually.

At Anahola the plantation has excellent facilities for shipping the sugar product either to Honolulu, the Mainland or Europe. The company conducts its own stores at Kealia and Kapaa. Following are the names of the officers:

Colonel Z. S. Spalding (sole owner), President.

R. P. Spalding, Secretary.

Geo. H. Fairchild, Manager and Treasurer. Mr. Fairchild has been identified with the plantation for thirteen years, seven of which as its manager.

Brewer & Co., Honolulu Agents.

THE ISLAND OF MAUI.

MAUI is the second island in size of the Hawaiian group and consists of two circular volcanic groups of mountains, around the bases of which, and sweeping down to the sea, are numerous plantations, with thousands of acres of waving sugar cane in all stages of growth.

The sugar cane lands on Maui are an eroded volcanic red dust with but little sand, no mineral to speak of, and very porous. Water is the life of the land, and is supplied largely by immense pumps, which raise millions of gallons daily at a slight elevation above the sea. All the natural water supply available has been utilized by immense ditches, and the supply is being largely augmented by tunnels which are being run under the streams to catch the lower strata of water.

The principal seaport of the Island of Maui is Kahului, where most of the export and import trade is carried on. Kihei and likewise Lahaina on the same island are quite important points of commerce, but the substantial and extensive improvements constructed at Kahului harbor and the natural surroundings make it practically the most available shipping point.

GENERAL VIEW OF KAHULUI HARBOR, AND WHARVES OF KAHULUI RAILROAD COMPANY

Kahului Railroad Co

The opening up for traffic and freight business of the Kahului Railroad Company marked a period of development and advance in the sugar industry of Maui. The total length of the main system is twelve miles, and having a three-foot gauge, and the entire railroad systems of the Kihei, Hawaiian Commercial & Sugar Co., Paia and Hamakuapoko plantations have been changed to a three-foot gauge to correspond with the gauge of the Kahului Railroad system. At the present time the Kahului Railroad is connected with the Hawaiian Commercial & Sugar Co.'s plantation railroad system aggregating seventy miles in length, giving a scope from Paia to Kihei and handling sugar from and delivering freight to all points between Wailuku and Paia.

Surveys have been made for an extension of the Kahului system from the main line near Spreckelsville, extending to the Paia and Hamakuapoko mills, a distance of five miles, having an average grade of sixty feet to the mile, enabling it to transport sugar direct from both mills to Kahului for shipment. It is expected that the road will be completed so as to handle the 1902 crop, which arrangement will greatly reduce the cost of handling the product.

In the establishing of a uniform and standard width of trackage upon all the plantations, a feature of the alignment of the grades is such that the railroad company can handle from forty to fifty cars of sugar in a single trip.

The rolling stock of the Kahului Railroad Company at the present time comprises four engines, 100 freight cars (about forty of which are equipped with air brakes), seven passenger coaches, etc.

Trains are run continuously over the system, each engine averaging about 100 miles a day.

At Kahului are the general headquarters of the company, where have been erected extensive and complete arrangements and facilities for the handling of the immense sugar output of the district, as likewise the handling of shiploads of freight and general merchandise consigned to the various plantations and the Island of Maui in general. Here have been erected facilities for handling of sugar second to none in the Hawaiian Islands, the plant being easily capable of handling 24,000 bags of sugar in a day if the weather is favorable.

As showing the magnitude of the company's operations it can be stated that for the year 1900 the total tonnage handled in and out at Kahului was 125,000 tons, the sugar product out being represented by 40,000 tons up to the close of the grinding season, which was in October.

For the storage of sugar pending the arrival of vessels the company has warehouse capacity for holding 82,000 sacks, distributed as follows: Kahului, 40,000; Paia, 20,000; Wailuku, 16,000. Two well-constructed wharves have been erected, which are fitted with the latest hoisting machinery, in addition to which are ten large barges or lighters, having a capacity for carrying seventy-five tons each, for conveying the sugar to the sides of the vessels. The company also has six complete moorings for vessels having a tonnage from 400 to 5000 tons, if need be, and drawing thirty feet or more water.

The 100-horsepower steel tug Leslie Baldwin is also a portion of the company's complete equipment, and is capable of delivering 5000 gallons of water an hour for fire or ship purposes. She is gear rigged to make her a pump for leaky vessels, fitted out with searchlights for night work, and built to go into four feet of water, if necessary, and is also used for towing vessels, as likewise the sugar lighters to sides of vessels.

The welfare of the large number of laborers found necessary to perform the labor required is carefully considered, the company having laid out a large camp built on modern plans and kept in the best of sanitary condition. Here are accommodated from thirty to forty families, while in a separate camp are the headquarters of from 100 to 125 single men. The average number of men employed the year around is 175, which includes ordinary laborers and company men, such as engineers, mechanics, bookkeepers, etc. Plans have already been drawn for the erection of a first-class hotel on the company's ground, as likewise other substantial improvements. One of the important features of the company's operations at Kahului is the maintenance of a large general lumber and merchandise business, where is carried a stock valued at fully $200,000.

The Kahului Railroad Company is a corporation, the stock of which is controlled by the Hawaiian Commercial & Sugar Co. The property was formerly controlled by the Wilder estate. Upon the taking over of the property by the above company extensive improvements had been made, while the exports and imports at Kahului are yearly increasing, in consequence of which the company is quite naturally enlarging and extending its facilities from year to year.

The above company, with its extensive operations, constitutes one of the most important commercial enterprises in the Hawaiian Islands, of which concern Alexander & Baldwin, Limited, of San Francisco and Honolulu, are the general agents.

R. W. Filler is the general manager of this extensive property, which position he has held for two years. Previous to that time he was the head bookkeeper at Spreckelsville, having come to Maui after being in the employ of the O. R. & L. Co. in various capacities.

VIEW OF THE HARBOR OF KIHEI—PORTION OF WHARVES AND SHIP LIGHTERERS

Kihei Plant. Co., Ltd.

The Kihei Plantation Company, Limited, was incorporated in February, 1899, and comprises 5000 acres of land, 90 per cent of which is considered well adapted for the cultivation of sugar cane, when once cleared and placed in condition ready for plowing. The lands are all owned in fee simple by the company, and are located in the Puehunui and Kalialinui sections of Kula, District of Makawao, Island of Maui. The soil is a sandy loam and red, has a most beautiful slope for thorough irrigation, and reaches to the ocean front.

About 1600 acres have been planted in cane of the Lahaina variety, and for its age it looks remarkably well in places. The first cane was planted in December, 1898, running from an elevation of twenty feet above sea level to an altitude of 350 feet. The first cane crop is now being cut and ground in the mill of the Hawaiian Com-